



## Evaluation of Quality Protein Maize Using AMMI Model

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### Abstract

Maize is the most important staple food in Zambia with human consumption averaging 91 kg capita<sup>-1</sup> year<sup>-1</sup> and is nutritionally deficient in two essential amino acids: tryptophan and lysine. Despite the development of quality protein maize (QPM) with high tryptophan and lysine, stunting and kwashiorkor remain high due lack of high yielding and adapted QPM varieties. The objective of this study was to evaluate a new generation of QPM varieties for yield and stability using site regression (SREG) model analysis. Before the QPM varieties were validated on-farm, they were simultaneously selected in four types of environments; (i) recommended agronomic management and high rainfall conditions (optimum), (ii) low-N stress, (iii) low-P stress and (iv) random stress. At each location an alpha lattice (0,1) design with three replicates was used and the number of entries ranged from 50 to 60. In 2014/15 seasons, 10 elite QPM varieties were selected from the on-station trials and compared with the best commercial check varieties on-farm. On-farm trials were conducted under farmer management practices and each farmer was considered as a block in a randomized complete block design. Analysis of variance for additive main effects and multiplicative interaction (AMMI) across the two seasons showed significant differences ( $P \leq 0.05$ ) for genotype x environment interaction (G x E) thereby indicating opportunities to select for high yield and stability among genotypes. The new QPM varieties showed a yield advantage over the commercial check varieties by 6.6-18.2%. The results showed both narrow and broad adaptability, with hybrid CZH132044Q showing narrow adaptation while CZH142259Q broad adaptability.

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